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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,912	08/23/2001	Bernd Mueller	R-36127	6415

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Walter Ottesen
PO Box 4026
Gaithersburg, MD 20885-4026

EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/856,912

Applicant(s)

MUELLER ET AL

Examiner

Kaj Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-15 is/are allowed.
- 6) ☒ Claim(s) 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 10 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Gao et al (USP 6,551,497).
3. With respect to claim 10, Gao discloses a method of operating a mixed-potential exhaust gas probe for an internal combustion engine (see Background of the Invention in col. 1 and 2). The exhaust gas probe comprising a heatable probe ceramic, a first electrode 42 mounted in a chamber 39 subjected to a reference atmosphere, a second electrode 32 arranged in the exhaust gas of the engine (fig. 3(B) and col. 5, lines 49-67). Gao discloses applying a pump voltage across the electrodes via voltage and current source 35 (col. 4, lines 52-67). With respect to the limitation requiring the pump voltage reduce the partial pressure of the reference chamber, because Gao discloses both positive and negative pump voltages (col. 4, line 61), Gao thereby discloses both pumping oxygen out of and into the reference chamber. Said voltage of Gao is applied such a constant current is applied and the result of said applied current is the measurement of a voltage across the electrodes that deviates from the thermodynamic equilibrium (col. 4, lines 54 and 55 and the last three lines of the abstract).

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4. With respect to claim 11, see Table 1 in col. 8.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao in view of Logothetis et al (pp. 136-154 of Fundamental and Applications of Chemical Sensors, 1986).

8. With respect to claim 8, Gao discloses a method of operating a mixed-potential exhaust gas probe for an internal combustion engine (see Background of the Invention in col. 1 and 2). The exhaust gas probe comprising a heatable probe ceramic, a first electrode 42 mounted in a chamber 39 subjected to a reference atmosphere, a second electrode 32 arranged in the exhaust gas of the engine (fig. 3(B) and col. 5, lines 49-67). Gao discloses applying a pump voltage

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across the electrodes via voltage and current source 35 (col. 4, lines 52-67). With respect to the limitation requiring the pump voltage reduce the partial pressure of the reference chamber, because Gao discloses both positive and negative pump voltages (col. 4, line 61), Gao thereby discloses both pumping oxygen out of and into the reference chamber depending on the choice of polarity of voltage across the circuit. Said applied voltage of Gao is constant and causes the thermodynamic equilibrium voltage of the wanted reaction to differ from the applied voltage (e.g. table 1 in col. 8). Gao does not teach the step of measuring and evaluating the current across the electrodes (Gao teaches the use of a voltmeter). However, the relationship between current flow and potential across a pair of electrodes is well known in the art (i.e. it stems from Ohm's law). In fact, both voltmeters and ammeters are based on the principle of galvanic meters. In particular, Logothetis teaches that the voltage across electrodes (i.e. the electromotive force (EMF)) can be derived from either a measure of the voltage across the electrodes or the current flowing across a load resistor (equations 2 and 3 of p. 137 and the associated discussion). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Logothetis for the method of Gao because the substitution of one known means for determining potential difference (i.e. a voltmeter) for another (i.e. an ammeter), when the results are not unexpected requires only routine skill in the art.

9. With respect to claim 9, see Table 1 in col. 8.

Response to Arguments

10. Applicant's amendment to the claims has overcome the previous 112 rejections.

11. With respect to claim 10 and the prior art rejection, applicant urges that the Gao reference fails to teach the method step beginning "applying a constant current" with particular attention to the step of using a voltage deviating from the thermodynamic equilibrium voltage of the desired reaction. The applicant does not elaborate on how they arrived at this conclusion so it is unclear what the applicant specifically considers is lacking in the reference. For the clarification of the record, the examiner will explain in more detail the basis for the set forth rejection. In particular, Gao, like the instant invention, is drawn to a mixed-potential exhaust gas probe and Gao teaches applying a constant current across a pair of electrodes. The instant invention is drawn to applying the current such that the voltage across the electrodes both reduces the oxygen partial pressure and deviates from a thermodynamic equilibrium voltage. Figure 3 of the instant invention shows a number of the voltages that satisfy the claimed condition. However, Gao teaches the use of those same voltages (col. 4, lines 59-61). Any number of those voltages utilized by Gao would both reduce the oxygen partial pressure and deviate from the thermodynamic equilibrium voltage of the desired reaction. Although Gao might not have realized that their choice of voltage deviated from the thermodynamic equilibrium, it nevertheless inherently would have. In fact, any prior art reference that taught applying some range of potential would meet this requirement because the thermodynamic equilibrium voltage would be a single potential value and every potential of the range that is not that equilibrium potential thereby deviates from that potential. The applicant may have discovered a new reason for applying the potentials that are off equilibrium (e.g. reducing the transverse sensitivity to HC), it has been well established that patentability that cannot be granted for coming up with a new reason for doing what the prior art already set forth doing.

12. With respect to claim 8, it is also unclear what specifically the applicant is objecting to concerning this rejection. With respect to the issue of whether the potential deviates from thermodynamic equilibrium, that issue has been addressed in the preceding paragraph.

Allowable Subject Matter

13. Claims 12-15 are allowed for the reasons set forth in the previous office action.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The

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examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (571) 272-1342.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for all official communications is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read 'Kaj Olsen', with a long horizontal flourish extending to the right.

Kaj K. Olsen
Primary Examiner
AU 1753
January 12, 2004